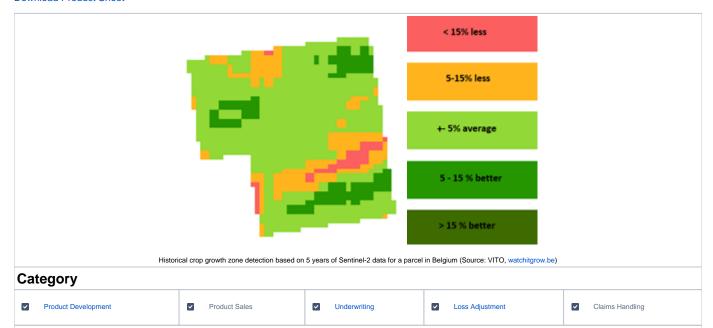
# **Crop Growth Zone Detection**

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# PRODUCT DESCRIPTION

A crop parcel is mostly uniformly treated by farmers and local weather conditions. Many fields however show a spatial variability in crop performance in the course of the growing season. Such variability is caused by a variety of natural and technology factors.

Where a multiyear recurrent variability is caused by differences in soil types, topography, weather micro-zones, crop growing technologies applied by the farmer, level of precipitation and irrigation access, while more abrupt and unexpected field variability could be caused by extreme weather events (e.g.: hail, storm, flood, drought, etc.).

Availability of crop growth zones is important for all stages of insurance product cycle, while the highest importance of such information is for agricultural underwriting and loss adjustment.

## PRODUCT SPECIFICATIONS

## Main processing steps

Satellite information derived from Sentinel-2 can support the evaluation of historical natural field variability as compared to the near real time detection of less/better performing zones within crop parcels.

#### Input data sources

Optical: Sentinel-2

Radar: n.a.

Supporting data: for development: field yield samples

#### Spatial resolution and coverage

Spatial resolution: 10 m

Coverage: crop parcel

Availability: On demand

#### **Accuracy / constraints**

Thematic accuracy: The maps do not represent a physical quantity hence only a qualitative assessment is possible, e.g. by relating the maps with intra-field yield variability, detailed soil maps or crop damage maps. It is advised to perform an assessment with the service provider on a study area to evaluate the quality of the maps for a specific usage and region.

Spatial accuracy: See Thematic accuracy.

#### Limitations

Challenging to detect the underlying processes of the intra-field variability: e.g. soil, agricultural management, crop damage.

Ancillary information on weather conditions and crop type are required to interpret the detected crop growth zones.

### Frequency / timeliness

Frequency: static maps or updated regularly (+- weekly)

Timeliness: historical data or < 2 weeks

## **Delivery / output format**

Data type: raster, vector

File format: GeoTIFF, Shapefile

### **Accessibility**

Available on demand from EO service providers.

# CHALLENGES ADDRESSED - USE CASE(S)

- Index insurance: Risk / crop modelling (Correlation of EO data with in-situ data)
   Index insurance: Relation between weather and impact on crop productivity
   Index insurance: Platform for crop health products

- Illoca insurance, Flaudini for order flaudini production.
   Elaboration of crop profile: Field crops, vegetables
   Information on forest health and production at different temporal scales (realtime monitoring, historical development)
   Radar data (eliminated cloud cover effects)

- Risk exposure (product design and customer communication)
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  Crop growth status during the pre-winter vegetation season of winter crops
  Benchmark for anomaly indication of abnormal natural occurrence of crop growth

#### Product Sales

- Client Outreach
   Pre-contractual Consulting (show-case risk exposure)
   Greater acceptance of index covers by farmers
- Regular market penetration reviewRisk alerts

#### Underwriting:

- Seasonal portfolio monitoring
   Online platforms or easy-to-use integrating various data sources (vegetation stress, field boundary changes, comparison)
   Risk / crop zoning

- Actual crop health (vegetation)
   Global/Regional production trends (e.g. monitoring specific crop acreages of surrounding regions/countries)
   Procure better reinsurance terms/capacity from enhanced insurance practice
- Crop calendar and practices
- Regular assessment of risk pricing and product rating

#### Loss Adjustment:

- Workforce allocation and planning
  Benchmark physical field observations against yield loss detection (e.g. product calibration)
  Risk mapping against crop's vegetation stages
  Increase credibility of loss adjustment (e.g. show EO data/visualization to support loss adjustment communication to farmer)
  Enhance field survey (better precision with EO data support)
  Detect crop damage at field level
  Assess crop damage at field level
  Instruct field heterogeneity with crop damage

- Identification of actual damage size (tons (volume) / ha (area) / price (yield value))
   Quality control assessment of claims before pay-out
   Fraud detection
   Obtaining timely, reliable and consistent data to speed-up the indemnity pay-outs